detecting the projected signal at the other of the x-ray source or image receptor associated with said radiographic imager; and

determining the distance between said x-ray source and image receptor based on the travel time of said radiated signal.

A2 cont'd

9. (Amended) The method of claim 8, further comprising continuously displaying said distance to a radiologic technologist as said distance is changed by altering the relative position of a of an x-ray source and the image receptor.

REMARKS

The comments of the Examiner set forth in the official office action dated September 6, 2002 have been carefully studied and reviewed. In this response, claims 1, 2, 3, 8 and 9 have been amended. For the reasons articulated below, it is respectfully urged that the claims presently pending in this application clearly define over the cited art and allowance is respectfully requested.

In the office action, the Examiner has rejected all twenty claims as being anticipated by the patent to Graumann, U.S. Patent No. 6,120,180. There is a very basic distinction between Applicant's invention and the Graumann patent. Applicant's invention deals with an x-ray device or a radiographic imager where there is an x-ray source and an image receptor and at least one of these two components can be moved with respect to the other. Applicant's invention deals with determining the distance between the x-ray source and the image receptor. The Graumann patent, on the other hand, is not at all concerned with the distance between the image receptor and the x-ray source. Indeed, from a review of the Graumann patent and its drawings, it appears that these two components are fixed with respect to each other as they are mounted on a C-shaped ring. However, and to the contrary, Graumann is interested in only determining the distance on the one hand between the x-ray source and a plurality of fixed

points on the x-ray device, and on the other hand the distance between the x-ray receiver and the group of fixed points on the x-ray device. Again, the Graumann patent is not at all concerned with the distance between the x-ray source and the x-ray receiver.

This is because, the Graumann patent is interested in transforming 2D projections into a 3D reconstruction. In order to do this, Graumann teaches that it is important to be able to determine the projection angles. See Graumann's Summary of Invention, col. 2, lines 38-62 and col. 2, lines 1-12.

Graumann goes on to teach that to determine the different projection angles of the 2D projections - which are absolutely necessary for a 3D reconstruction, the body region of the patient from the 2D projections - the C-arm x-ray apparatus 1 has a number of reception devices arranged at the cart 3 which is stationary relative to the C-arm 8. The reception devices are ultrasound receivers 15.1 through 15.9. The x-ray source 9 and the x-ray receiver 10 are each provided with transmission devices in the form of ultrasound transmitters 16 and 17. Therefore, as viewed in Figure 2, for example, these systems simply measure the distance between the x-ray receiver 10 and any one of the fixed detectors 15.1 - 15.9 and at the same time the system measures the distance between the x-ray source 9 and any one of the fixed points 15.1 - 15.9. Again, Graumann does not concern itself with measuring the distance between the x-ray source and the x-ray receiver. Indeed there is no suggestion in Graumann that it is desirable or that there is any need whatsoever in doing so. That is, of course, the central focus of Applicant's invention.

A review of the claims shows that the claims are now all limited to determining the distance between the x-ray source and the image receptor. This is accomplished by directing a radiated signal that is effective to measure the distance at any selected time between these two components of the radiographic imager of the present invention.

Note for example, Claim 1 calls for a radiographic imager having a measuring device for determining the distance between an x-ray source and an image receptor associated with the

radiographic imager. The claim calls for a radiated signal position at one of the x-ray source or image receptor of the radiographic imager. Further, there is provided a detector position at the other one of the x-ray source or image receptor. Then there is provided a circuit connected to the radiated signal source and the detector for determining the travel time of the radiated signal between the x-ray source and the image receptor, thereby determining the distance between the x-ray source and the image receptor.

As discussed above, clearly the Graumann patent does not anticipate or render unpatentable the claimed invention of claim 1 as amended herein. The Examiner will note that the other claims, as amended herein, define the concept of a radiographic imager that is provided with the capability of measuring the distance between the x-ray source and the image receptor.

For the reasons set forth herein, it is respectfully urged that the present application is in condition for allowance and allowance is respectfully requested.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."** If additional fees are required, please charge them to Deposit Account No. 18-1167.

Respectfully submitted,

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1. (Amended) A radiographic imager having a measuring device for determining the distance between [two selected points] an x-ray source and an image receptor associated with the radiographic imager, comprising:

a radiated signal source positioned at [a first point] one of the x-ray source or image receptor associated with said radiographic imager and operative to project a radiated signal;

a detector positioned at [a second point] the other one of the x-ray source or image receptor associated with said radiographic imager and operative to detect said radiated signal; and

a circuit connected to said radiated signal source and said detector, said circuit operative to determine the travel time of said radiated signal between said [first point] x-ray source and said image receptor [second point], and thereby determine the distance between the x-ray source and the image receptor.

4. (Amended) The device of claim 1, wherein

said radiated signal is projected from said radiated signal source to said detector in a straight line, and

said distance between said [two selected points] x-ray source and image receptor is determined by multiplying the propagation speed of said radiated signal by said travel time of said radiated signal.

5. (Amended) The device of claim 1, further comprising a surface associated with said radiographic imager, and wherein

said radiated signal is directed from said signal source to said surface;

said radiated signal is reflected from said surface to said detector; and

the distance between said surface and the closer of said signal source and said detector is calculated as:

the propagation speed of said radiated signal multiplied by said travel time of said radiated signal

less the distance from said source to said detector in the direction of said surface.

8. (Amended) A method of determining the distance between an x-ray source and an image receptor [two points] associated with a radiographic imager, comprising:

projecting a radiated signal from [a first point] one of the x-ray source or the image receptor associated with said radiographic imager;

detecting the projected signal at [a second point] the other of the x-ray source or image receptor associated with said radiographic imager; and

determining the distance between said [first and second points] x-ray source and image receptor based on the travel time of said radiated signal.

9. (Amended) The method of claim 8, further comprising continuously displaying said distance to a radiologic technologist as said distance is changed by altering the relative position of a [radiation beam] of an x-ray source and [an] the image receptor.